THE Water Research FOUNDATION

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REQUEST FOR PROPOSALS (RFP)

Defining Exposures of Microplastics/Fibers (MPs) in All Waters: Occurrence, Monitoring, and Management Strategies (RFP 5088)

Due Date: Proposals must be received by 2:00 pm Mountain Time on
Thursday, October 29, 2020
WRF Project Contact: Lola Olabode, lolabode@waterrf.org

Project Sponsors
This project is funded by The Water Research Foundation (WRF) as part of WRF's Research Priority Program.

Project Objectives
The objectives of this project are to:

- Characterize typical microplastic (MP) numbers, types, and sizes in all waters (including secondary and tertiary treated wastewater, recycled water, stormwater, drinking water supplies—ambient waters, and treated drinking water);
- Develop reliable monitoring and sampling guidelines, based on MP sizes and source media;
- If needed, develop a decision-making framework for MP reduction strategies from the whole water supply cycle. (Note: Thresholds for risk potentials are not defined in this RFP. Some jurisdictions will act on more precautionary thresholds than others [e.g., population vs. organismal effects]. It may be reasonably assumed that with continued input of a persistent chemical into the environment [i.e., plastic], exceedance of risk thresholds is inevitable. Researchers should clearly define and provide a rationale for thresholds for risk potentials within the context of their research project/proposed work plan); and
- Describe the relative effectiveness of various technologies and legislation to mitigate sources and pathways of MPs.

Budget
Applicants may request up to $225,000 in WRF funds for this project. WRF funds requested and total project value are evaluation criteria considered in the proposal selection process.

Background and Project Rationale
The 2017 Water Environment & Reuse Foundation project, *Microplastics in Aquatic Systems: An Assessment of Risk* (Burton 2017), produced a white paper providing an overview of MPs in ambient waters, treated wastewaters, and sediments. This white paper and the comprehensive, state-of-the-science report by Science Advice for Policy by European Academies (2018), titled *A Scientific Perspective on Microplastics in Nature and Society*, summarized past and recent literature on MP occurrence in the environment, the relative risk to humans and ecosystems, and the large uncertainties that remain. Since

the initial reactions in the early-to-mid 2000s to MPs in water, a growing body of peer-reviewed literature has shown consensus on the scope and scale of MPs and where uncertainties and research needs still exist (Gouin et al. 2019). Important data gaps and uncertainties exist and must be addressed. Laboratory toxicity studies demonstrate increased hazards from microplastics at small size ranges (100 micron to nanoscale size), which are not typically measured, making reliable assessments of risk unfeasible. Accurately sampling and identifying smaller synthetic MPs and fibers remains difficult (Primpke et al. 2020), and a significant proportion of false positives is common, most often through visual microscopy. Furthermore, self-contamination from clothing and aerial deposition present significant challenges to accurately sampling and monitoring in water (Scopetani et al. 2020, Brahney et al. 2020). What are the best ways to sample and identify small MPs using cost-effective approaches? If the abundance of synthetic MPs and fibers cannot be accurately estimated, how can risk, treatment need, or treatment effectiveness be determined?

Research Approach

Research tasks:

1) Survey recent MP/fiber literature to establish where consensus exists and key data gaps of the above four objectives.
    - Develop recommendations for guidance, including decision-making frameworks for each water media, and research priorities.
2) Address known priority areas, such as:
    - Define the occurrence and optimal sampling/identification methods for MPs/fibers ranging from 0.001 to 5,000 microns in size, using a combination of literature review and field and laboratory studies.
    - Collaborate with other organizations to ensure broad support for the project design and also additional funding support.
3) Develop a well-structured open database of high-quality MP/fiber occurrence in relevant water media, selected from studies having proper quality assurance and quality control (QA/QC) (Koelmans et al. 2019). This database will guide the development of exposure and fate models for project description #2, thereby allowing for the estimation of risk based on different product usage and mitigation scenarios (Lau et al. 2020).
4) Document the data management and QA/QC protocols. Review and consider adopting the reproducibility reporting guidelines outlined in Cowger et al. 2020.
5) Develop direct decisions on mitigation strategies based on varying levels of predicted/estimated risk (as described in research task #2). The proposed mitigation strategies should consider direct and indirect costs, known and unknown externalities, co-benefits, communication strategies, and uncertainties.
6) Establish a working group comprised of leaders/principal investigators from all MP prioritized WRF research topics, and their respective projects, to ensure each benefits the other in real-time implementation and planning phases.

Estimated task duration (Note: some tasks will be conducted in parallel with each other):

- Task 1: 8-12 months
- Task 2: 2 years
- Task 3: 2 years
- Task 4: 1 year
- Task 5: 3 years

This RFP is intentionally flexible in the research approach to encourage creativity and originality from proposers. Proposers should describe how they will conduct the research to meet the objectives listed above. Proposers should exercise caution regarding communicating MP risks and uncertainties in their research approach (Völker et al. 2019). The approach listed above is intended as a starting point.

Expected Deliverables

- White paper and peer-reviewed paper for the literature review (latest update).
- Report, peer-reviewed paper(s), utility webinar, story-board, and short video clip.
- Fact sheets, infographics, and other user-friendly and interactive resources/tools.

Communication Plan

Please review WRF's *Project Deliverable Guidelines* for information on preparing a communication plan. The guidelines are available at https://www.waterrf.org/project-report-guidelines. Conference presentations, webcasts, peer review publication submissions, and other forms of project information dissemination are typically encouraged.

Project Duration

The anticipated period of performance for this project is 36 months from the contract start date.

References and Resources

The following list includes examples of research reports, tools, and other resources that may be helpful to proposers. It is not intended to be comprehensive, nor is it a required list for consideration.

- Brahney, J., M. Hallerud, E. Heim, M. Hahnenberger, and S. Sukumaran. 2020. "Plastic Rain in Protected Areas of the United States." *Science*, 368: 1257–1260.
- Burton, G. A., Jr. 2017. *White Paper - Microplastics in Aquatic Systems: An Assessment of Risk*. Project CEC7R17. Alexandria, VA: Water Environment & Reuse Foundation.
- Cowger, W., A. M. Booth, B. M. Hamilton, C. Thaysen, S. Primpke, K. Munno, A. L. Lusher, A. Dehaut, V. P. Vaz, M. Liboiron, L. I. Devriese, L. Hermabessiere, C. Rochman, S. N. Athey, J. M. Lynch, H. De Frond, A. Gray, O. A. H. Jones, S. Brander, C. Steele, S. Moore, A. Sanchez, and H. Nel. 2020. "Reporting Guidelines to Increase the Reproducibility and Comparability of Research on Microplastics." *Appl Spectrosc.* https://journals.sagepub.com/doi/10.1177/0003702820930292.
- Gouin, T., R. A. Becker, A. -G. Collot, J. W. Davis, B. Howard, K. Inawaka, M. Lampi, B. S. Ramon, J. Shi, and P. W. Hopp. 2019. "Toward the Development and Application of an Environmental Risk Assessment Framework for Microplastic." *Environ Toxicol Chem*, 38: 2087–2100.
- Koelmans, A. A., N. H. M. Nor, E. Hermsen, M. Kooi, S. M. Mintenig, and J. De France. 2019. "Microplastics in Freshwaters and Drinking Water: Critical Review and Assessment of Data Quality." *Water Research*, 155: 410–422.
- Lau, W. W. Y., Y. Shiran, R. M. Bailey, E. Cook, M. R. Stuchtey, J. Koskella, C. A. Velis, L. Godfrey, J. Boucher, M. B. Murphy, R. C. Thompson, E. Jankowska, A. C. Castillo, T. D. Pilditch, B. Dixon, L. Koerselman, E. Kosior, E. Favoino, J. Gutberlet, S. Baulch, M. E. Atreya, D. Fischer, K. K. He, M. M. Petit, U. R. Sumaila, E. Neil, M. V. Bernhofen, K. Lawrence, and J. E. Palardy. 2020. "Evaluating Scenarios toward Zero Plastic Pollution." *Science*. doi:10.1126/science.aba9475.
- Primpke, S., S. H. Christiansen, W. Cowger, H. De Frond, A. Deshpande, M. Fischer, E. Holland, M. Meyns, B. A. O'Donnell, B. Ossmann, M. Pittroff, G. Sarau, B. M. Scholz-Böttcher, and K. Wiggin. 2020. "Critical Assessment of Analytical Methods for the Harmonized and Cost Efficient Analysis of Microplastics." *Appl Spectrosc.* doi:10.1177/0003702820921465.

- Science Advice for Policy by European Academies. 2018. *A Scientific Perspective on Microplastics in Nature and Society*. Berlin: SAPEA.
- Scopetani, C., M. Esterhuizen-Londt, D. Chelazzi, A. Cincinelli, H. Setälä, and S. Pflugmacher. 2020. "Self-Contamination from Clothing in Microplastics Research." *Ecotoxicology and Environmental Safety*, 189: 110036.
- Völker, C., J. Kramm, and M. Wagner. 2019. "On the Creation of Risk: Framing of Microplastics Risks in Science and Media." *Global Challenges*. doi:10.1002/gch2.201900010.
- WRF. Forthcoming. *Determining the Fate and Major Removal Mechanisms of Microplastics in Water and Resource Recovery Facilities*. Project 4936. Alexandria, VA: The Water Research Foundation. (contact lolabode@waterrf.org for report)

Proposal Evaluation Criteria

The following criteria will be used to evaluate proposals:

- Understanding the Problem and Responsiveness to RFP (maximum 20 points)
- Technical and Scientific Merit (maximum 30 points)
- Qualifications, Capabilities, and Management (maximum 20 points)
- Communication Plan, Deliverables, and Applicability (maximum 15 points)
- Budget and Schedule (maximum 15 points)

Proposal Preparation Instructions

Proposals submitted in response to this RFP must be prepared in accordance with the WRF document *Guidelines for Research Priority Program Proposals*. The current version of these guidelines is available at https://www.waterrf.org/proposal-guidelines, along with *Instructions for Budget Preparation*. The guidelines contain instructions for the technical aspects, financial statements, indirect costs, and administrative requirements that the applicant must follow when preparing a proposal.

Eligibility to Submit Proposals

Proposals will be accepted from domestic or international entities, including educational institutions, research organizations, governmental agencies, and consultants or other for-profit entities.

WRF's Board of Directors has established a Timeliness Policy that addresses researcher adherence to the project schedule. The policy can be reviewed at https://www.waterrf.org/policies. Researchers who are late on any ongoing WRF-sponsored studies without approved no-cost extensions are not eligible to be named participants in any proposals. Direct any questions about eligibility to the WRF project contact listed at the top of this RFP.

Administrative, Cost, and Audit Standards

WRF's research program standards for administrative, cost, and audit compliance are based upon, and comply with, Office of Management and Budget (OMB) Uniform Grants Guidance (UGG), 2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards, and 48 CFR 31.2 Contracts with Commercial Organizations. These standards are referenced in WRF's *Guidelines for Research Priority Program Proposals*, and include specific guidelines outlining the requirements for indirect cost negotiation agreements, financial statements, and the Statement of Direct Labor, Fringe Benefits, and General Overhead. Inclusion of indirect costs must be substantiated by a negotiated agreement or appropriate Statement of Direct Labor, Fringe Benefits, and General Overhead. Well in advance of preparing the proposal, your research and financial staff should review the

detailed instructions included in WRF's *Guidelines for Research Priority Program Proposals* and consult the *Instructions for Budget Preparation*, both available at https://www.waterrf.org/proposal-guidelines.

Budget and Funding Information
The maximum funding available from WRF for this project is $225,000. The applicant must contribute additional resources equivalent to at least 33 percent of the project award. For example, if an applicant requests $100,000 from WRF, an additional $33,000 or more must be contributed by the applicant. Acceptable forms of applicant contribution include cost-share, applicant in-kind, or third-party in-kind that comply with 2 CFR Part 200.306 cost sharing or matching. The applicant may elect to contribute more than 33 percent to the project, but the maximum WRF funding available remains fixed at $225,000. **Proposals that do not meet the minimum 33 percent of the project award will not be accepted.** Consult the *Instructions for Budget Preparation* available at https://www.waterrf.org/proposal-guidelines for more information and definitions of terms.

Period of Performance
It is WRF's policy to negotiate a reasonable schedule for each research project. Once this schedule is established, WRF and its sub-recipients have a contractual obligation to adhere to the agreed-upon schedule. Under WRF's No-Cost Extension Policy, a project schedule cannot be extended more than nine months beyond the original contracted schedule, regardless of the number of extensions granted. The policy can be reviewed at https://www.waterrf.org/policies.

Utility and Organization Participation
WRF encourages participation from water utilities and other organizations in WRF research. Participation can occur in a variety of ways, including direct participation, in-kind contributions, or in-kind services. To facilitate their participation, WRF has provided contact information, on the last page of this RFP, of utilities and other organizations that have indicated an interest in this research. Proposers are responsible for negotiating utility and organization participation in their particular proposals. The listed utilities and organizations are under no obligation to participate, and the proposer is not obligated to include them in their particular proposal.

Application Procedure and Deadline
Proposals are accepted exclusively online in PDF format, and they must be fully submitted before 2:00 pm Mountain Time on Thursday, October 29, 2020. All proposal documents must be compiled into two PDF files consisting of your technical review documents and your financial review documents. All forms and components of the proposal are available in the *Proposal Component Packet* zip file on the proposal website at https://proposals.waterrf.org/Pages/RFPs.aspx. An FAQ and a tutorial are also available. A login is required to access the proposal website and download the packet. Proposers are encouraged to create logins and verify the validity and compatibility of the system well in advance in order to avoid last-minute errors or delays.

The online proposal system allows submission of your documents until the date and time stated in this RFP. To avoid the risk of the system closing before you press the submit button, do not wait until the last minute to complete your submission.

Questions to clarify the intent of this RFP and WRF's administrative, cost, and financial requirements may be addressed to the WRF project contact, Lola Olabode at (571) 384-2109 or lolabode@waterrf.org. Questions related to proposal submittal through the online system may be addressed to Caroline Bruck at (303) 347-6118 or cbruck@waterrf.org**.**

5088 Utility and Organization Participants

The following utilities have indicated interest in possible participation in this research. This information is updated within 24 business hours after a utility or an interested organization submits a volunteer form, and this RFP will be re-posted with the new information. **(Depending upon your settings, you may need to click refresh on your browser to load the latest file.)**

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